

I claim:

1. A method of screening a plant to determine whether said plant is a cross between *Tripsacum* and teosinte, said method comprising the following steps:

- (a) isolating the total genomic DNA from the plant in (c); then
- (b) digesting said genomic DNA with one to five of the restriction enzymes selected from the group consisting of *EcoRI*, *EcoRV*, *HindIII*, *BamHI* and *MspI*; then
- (c) probing said digested genomic DNA with one or more DNA markers selected from the group consisting of the maize nuclear DNA probes, maize mitochondrial DNA probes, and *Tripsacum* DNA probes recited below; and then
- (d) determining the presence of one or more of the following restriction fragments of the following fragment sizes, wherein said restriction fragments are characterized by the following molecular marker-restriction enzyme associations and the associated fragment sizes selected from the group consisting of:

BNL5.62, *EcoRI*, 10.3 kb; npi97, *HindIII*, 3.9 kb; UMC157, *EcoRI*, 6.5 kb and 3.3 kb; UMC157, *HindIII*, 5.5 kb; UMC157, *BamHI*, 14.0 kb, 8.5 kb and 4.5 kb; UMC11, *BamHI*, 7.0 kb; CSU3, *BamHI*, 10.0 kb and 7.6 kb; UMC67, *EcoRI*, 19.2 kb; UMC67, *BamHI* 13.4 kb, 11.0 kb and 1.6 kb; CSU92, *BamHI*, 13.3 kb and 7.5 kb; asg62, *BamHI*, 12.7 kb, 9.7 kb and 6.6 kb; UMC58, *HindIII*, 3.3 kb; CSU164, *EcoRI*, 9.0 kb and 7.0 kb; UMC128, *HindIII*, 6.0 kb; UMC107, *EcoRI*, 7.5.0 kb, 6.3 kb and 6.1 kb; UMC140, *EcoRI*, 4.9 kb; UMC140, *HindIII*, 6.5 kb; adh1, *HindIII*, 9.4 kb; adh1, *BamHI*, 9.4 kb; UMC161, *HindIII*, 3.3 kb; BNL8.29, *HindIII*, 9.3 kb and 8.3 kb· UMC53, *EcoRI*, 9.4 kb; UMC53, *EcoRV*, 8.4 kb, 3.8 kb and 3.0 kb; UMC6, *EcoRI*, 3.8 kb; UMC6, *HindIII* 9.4 kb; UMC6, *BamHI*, 13.2 kb, 12.7 kb, and 7.0 kb; UMC61, *HindIII*, 3.4 and 2.8 kb agrr167, *BamHI*, 5.7 kb, 4.5 kb and 4.0 kb; UMC34, *EcoRI*, 7.5 kb and 5.4 kb; UMC34, *HindIII*, 8.8 kb, 6.5 kb and 5.8 kb; UMC34, *BamHI*, 9.4 kb; UMC135, *HindIII*, 11.6 kb and 10.8 kb; UMC131, *EcoRI*, 10.6 kb, 5.8 kb

and 4.3 kb; UMC55, EcoRI, 3.9 kb; UMC55, HindIII, 4.3 kb; UMC5, EcoRI, 5.4 kb; UMC5, HindIII, 6.5 kb; UMC49, BamHI, 8.2 kb; UMC36, BamHI, 4.2 kb; UMC32, EcoRI, 5.3 kb; UMC32, HindIII 6.7 kb, 6.0 kb, and 2.8 kb; asg24, HindIII, 7.2 kb and 6.4 kb; UMC121, EcoRI, 3.7 kb and 3.2 kb; BNL8.35, HindIII, 9.9 kb and 8.7 kb; UMC50, BamHI, 7.8 kb, 6.8 kb, 5.8 kb and 3.8 kb; UMC42, HindIII, 10.4 kb, 9.2 kb, 8.9 kb, 7.9 kb, 7.6 kb, and 3.7 kb; npi247, EcoRI, 8.0 kb; npi247, HindIII 3.0 kb; UMC10, HindIII, 3.0 kb; UMC10, EcoRI, 6.5 kb and 5.5 kb; UMC102, EcoRI, 2.7 kb; BNL6.06, EcoRI, 6.8 kb; CSU240, EcoRI, 10.6 kb, 4.5 kb and 3.3 kb; BNL5.37, HindIII, 10.3 kb, 5.8 kb and 3.5 kb; npi296, EcoRI, 7.9 kb; UMC3, EcoRI 2.5 kb and 2.0 kb; npi212, HindIII, 4.3 kb; npi212, BamHI, 5.4 kb; UMC39, EcoRI, 12.2 kb, 9.2 kb, 7.8 kb and 7.1 kb; phi10080, BamHI, 9.7 kb; UMC63, HindIII, 9.5 kb and 4.3 kb; CSU303, EcoRI, 10.0 kb; UMC96, HindIII, 11.8 kb, 6.4 kb and 5.5 kb; UMC96, BamHI, 7.5 kb; UMC2, EcoRI, 11.8 kb, 10.4 kb, 8.0 kb and 3.9 kb; CSU25, HindIII, 5.2 kb, 4.5 and 4.2 kb; agrr115, EcoRI, 8.0 kb and 5.4 kb; agrr115, BamHI, 5.4 kb and 3.5 kb; phi20725, EcoRI, 10.3 kb, 9.7 kb and 7.2 kb; phi20725, HindIII, 1.5 kb; UMC31, EcoRI, 5.8 kb and 2.0 kb; UMC31, BamHI 6.5 kb; UMC55, EcoRI, 3.9 kb; UMC55, HindIII, 4.3 kb; CSU235, HindIII, 6.8 kb and 3.0 kb; CSU585, HindIII, 8.3 kb and 6.1 kb; BNL5.46, HindIII, 13.7 kb, 10.5 kb, 9.7 kb and 5.1 kb; agrr321, BamHI, 5.5 kb; agrr89, HindIII, 7.1 kb; npi386, HindIII, 12.6 kb, 9.3 kb and 8.2 kb; UMC42, HindIII, 19.2 kb, 10.3 kb 8.9 kb, 7.6 kb, 3.7 kb and 3.0 kb; t<sub>da</sub>62, BamHI, 5.5 kb, 5.2 kb, 4.8 kb and 4.2 kb; BNL5.71, EcoRV, 11.3 kb, 6.8 kb, and 5.7 kb; UMC156, HindIII, 3.0 kb; UMC66, EcoRI, 10.5 kb; UMC66, BamHI, 3.7 kb and 2.4 kb; UMC19, BamHI, 12.3 kb; UMC104, HindIII, 12.4 kb, 11.6 kb and 7.5 kb; UMC104, BamHI, 9.4 kb; UMC133, HindIII, 10.6 kb, 9.9 kb, 9.2 kb and 7.7 kb; UMC52, BamHI, 8.7 kb, 6.9 kb, 3.8 kb, 3.0 kb and 2.0 kb; BNL15.07, HindIII, 2.9 kb and 2.7 kb; npi409, EcoRI, 9.4 kb; npi409, HindIII, 10.4 kb, 9.0 kb and 3.9 kb; UMC147, HindIII, 16.3 kb, 3.8 kb and 2.4 kb; asg73, EcoRI, 3.8 kb; UMC90, HindIII, 7.7 kb, 6.5 kb, 2.8 kb and 1.6 kb; UMC90, BamHI, 9.0 kb; UMC72, 8.5 kb; UMC27, HindIII, 8.3 kb and 4.5 kb; UMC27, BamHI, 6.5 kb; UMC43, BamHI, 9.7 kb, 7.3 kb and 5.7 kb; t<sub>da</sub>37, BamHI, 9.0 kb, 8.0 kb and 6.4 kb; UMC43, BamHI, 9.7 kb, 7.3 kb and 5.7 kb;

UMC40, *BamHI*, 7.2 kb, 4.7 kb and 4.3 kb; BNL7.71, *HindIII*, 10.6 kb; BNL5.71, *BamHI*, 11.3 kb, 6.8 kb and 5.7 kb; tda62, *BamHI*, 6.5 kb and 5.5 kb; UMC68, *HindIII*, 6.0 kb; UMC104, *HindIII*, 12.4 kb, 11.6 kb and 7.5 kb; UMC104, *BamHI*, 9.4 kb; phi10017, *BamHI*, 15.1 kb and 9.5 kb; tda50, *BamHI*, 8.5 kb; npi373, *HindIII*, 6.5 kb, 5.6 kb, 5.1 kb and 3.0 kb; tda204, *BamHI*, 4.0 kb; npi393, *EcoRI*, 12.1 kb, 8.5 kb, 7.0 kb and 5.6 kb; UMC65, *HindIII*, 2.9 kb; UMC46, *EcoRI*, 6.5 kb and 5.6 kb; asq7, *HindIII*, 6.3 kb; UMC28, *HindIII*, 15.8 kb and 11.9 kb; UMC28, *BamHI*, 9.9 kb, 7.6 kb and 6.6 kb; UMC134, *HindIII*, 7.5 kb and 4.7 kb; asq8, *HindIII*, 10.8 kb, 8.7 kb and 8.4 kb; phi20581, *HindIII*, 4.2 kb; O2, *EcoRI*, 9.4 kb; asq34, *HindIII*, 4.5 kb; BNL15.40, *HindIII*, 5.8 kb; UMC116, *EcoRI*, 9.5 kb; UMC110, *BamHI*, 10.6 kb, 4.9 kb and 3.9 kb; BNL8.32, *HindIII*, 8.9 kb, 7.4 kb and 7.1 kb; BNL14.07, *EcoRI*, 6.4 kb; UMC80, *HindIII*, 10.7 kb, 8.2 kb and 2.4 kb; BNL16.06, *EcoRI*, 6.8 kb and 1.9 kb; BNL16.06, *HindIII*, 5.7 kb, 3.0 kb and 1.6 kb; phi20020, *HindIII*, 7.8 kb, 6.6 kb and 5.1 kb; npi114, *HindIII*, 10.0 kb, 8.8 kb and 6.3 kb; BNL9.11, *HindIII*, 3.4 kb; UMC103, *HindIII*, 6.9 kb; UMC124, *HindIII*, 8.0 and 7.0; UMC124, *BamHI*, 6.6 kb, 2.6 kb and 1.6 kb; UMC120, *HindIII*, 3.2 kb, 2.3 kb and 1.4 kb; UMC89, *EcoRI*, 7.3 kb; UMC89, *HindIII*, 7.3 kb; UMC89, *BamHI*, 9.5 kb, 6.0 kb, 5.2 kb and 4.5 kb; UMC89, *MspI*, 6.7 kb and 5.8 kb; BNL12.30, *EcoRI*, 3.5 kb; UMC48, *HindIII*, 6.2 kb, 5.3 kb, 4.7 kb, 4.2 kb and 3.5 kb; UMC53, *EcoRI*, 3.8 kb and 3.0 kb; UMC53, *EcoRV*, 8.4 kb; npi268, *BamHI*, 6.4 kb; UMC7, *BamHI*, 4.2 kb; UMC3, *EcoRI*, 3.5 kb and 2.0 kb; phi10005, *EcoRI*, 15.0 kb and 1.6 kb; UMC113, *EcoRI*, 5.9 kb and 5.4 kb; UMC113, *BamHI*, 12.8 kb, 11.8 kb and 10.5 kb; UMC192, *HindIII*, 11.4 kb and 6.4 kb; wx (waxy), *HindIII*, 21.0 kb; UMC105, *EcoRI*, 3.9 kb; CSU147, *HindIII* 5.9 kb; BNL5.10, *HindIII*, 6.1 kb and 4.4 kb; UMC114, *BamHI*, 12.6 kb, 11.5 kb, 10.0 kb, 8.8 kb, 7.5 kb and 6.5 kb; UMC95, *EcoRI*, 5.6 kb; UMC95, *HindIII*, 7.7 kb, 7.3 kb, 4.8 kb, 4.5 kb 4.1 kb and 1.7 kb; UMC95, *BamHI*, 15.0 kb and 9.0 kb; asq44, *EcoRI*, 5.3 kb; CSU61, *EcoRI*, 8.1 kb and 4.8 kb; BNL7.57, *BamHI*, 11.6 kb and 5.9 kb; CSU54, *EcoRI*, 14.7 kb and 12.6 kb; phi20075, *EcoRI*, 7.1 kb; npi285, *EcoRI*, 12.4 kb, 9.4 kb and 6.0 kb; KSU5, *EcoRI*, 9.8 kb, 7.6 kb, 6.1 kb, 3.8 kb and 3.5 kb; UMC130, *EcoRI*, 13.5 kb and 7.0 kb; UMC130, *HindIII*, 4.8 kb and 3.2 kb; UMC130, *BamHI*, 3.2 kb; UMC64, *HindIII*, 3.3 kb; UMC152,

*Hind*III, 12.4 kb, 7.1 kb and 5.6 kb; phi06005, *Eco*RI, 12.8 kb; UMC163, *Hind*III, 7.0 kb, 4.8 kb, 3.0 kb, 2.6 kb and 2.3 kb; UMC44, *Hind*III, 9.8 kb, 8.7 kb, 7.2 kb, 5.5 kb and 4.0 kb; BNL10.13, *Hind*III, 10.8 kb; npi306, *Hind*III, 7.0 kb; pmt1, *Hind*III, 2.3 kb; pmt2, *Hind*III, 2.8 kb and 2.1 kb; pmt5, *Hind*III, 12.3 kb, 8.1 kb, 3.6 kb, 3.2 kb and 2.5 kb; tda48, *Hind*III, 8.2 kb; tda53, *Hind*III, 3.8 kb and 2.2 kb; tda168, *Eco*RI, 3.6 kb; tda16, *Hind*III, 4.3 kb; and tda17, *Hind*III, 7.0 kb; tda250, *Bam*HI, 4.0 kb.

2. A plant containing one or more novel restriction fragments identified by one or more molecular marker-enzyme combinations in claim 1 thereof, produced from a procedure comprising the steps of:

- (a) crossing a *Tripsacum* female parent with a teosinte male parent to produce (*Tripsacum* X teosinte) hybrid seed or a teosinte female parent with a *Tripsacum* pollen donor to produce (teosinte X *Tripsacum*) hybrid seed; then
- (b) growing a (*Tripsacum* X teosinte) or (teosinte X *Tripsacum*) hybrid plant from said seed to maturity; then
- (c) harvesting the seed produced in (c).

3. Seed from a plant in claim 2 that contains one or more restriction fragments produced in accordance with the method described in claim 1.

4. All hybrid plants, derivatives, variants, mutants, modifications, and cellular and molecular components that contain one or more restriction fragments set forth in claim 1 thereof, obtained from a plant as set forth in claim 2 or grown from seed according to claim 3.

5. Pollen produced by a plant according to claims 2 or 4 that contains one or more restriction fragments described in claim 1.

6. A tissue culture, all derivatives, variants, mutants, modifications, and cellular and molecular components from a plant according to claim 4 that contain one or more restriction fragments

described in claim 1.

7. A method of screening a plant in accordance with claim 1 wherein said plant is a maize plant that contains one or more restriction fragments described in claim 1 thereof.

8. A plant wherein said plant is a maize plant that contains one or more restriction fragments described in claim 1 thereof, and is produced from a procedure comprising the steps of:

- (a) crossing a *Tripsacum* female parent with a teosinte male parent to produce (*Tripsacum* X teosinte) hybrid seed or a teosinte female parent with a *Tripsacum* pollen donor to produce (teosinte X *Tripsacum*) hybrid seed; then
- (b) growing a (*Tripsacum* X teosinte) or (teosinte X *Tripsacum*) hybrid plant from said seed to maturity; then
- (c) crossing said seed from (*Tripsacum* X teosinte) or (teosinte X *Tripsacum*) hybrid plant with maize to produce seed;
- (d) harvesting the seed produced in (c).

9. Maize seed that contains one or more restriction fragments described in claim 1 thereof, produced from a plant in claim 8.

10. Maize plants, all derivatives, subsequent generations, variants, mutants, modifications, and cellular and molecular components that contain one or more restriction fragments described in claim 1 thereof, grown from said seed according to claim 9.

11. Pollen that contains one or more restriction fragments described in claim 1 thereof, produced by a plant according to claim 8 or claim 10.

12. Tissue cultures, all derivatives, variants, mutants, modifications, and cellular and molecular components that contain one or more restriction fragments described in claim 1 thereof, derived from said hybrid maize plants according to claim 8 or claim 10.